



The Collaborative Science, Technology, and Applied Research (CSTAR) Program

April 18 2014

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NWS-OST-SPB



Outline



✓ What?

- Types of awards
- Mechanics
- Benefits
- Research to Operations
- Status of Program

✓ Who/Where?

- Current Projects
- Future Projects



CSTAR Program

Overview



- ✓ An umbrella program for NWS/university collaborative research consisting of:
 - *Fully competitive, in-house, applied research grant program started in 2000*
 - One to three-year studies--maximum funding level \$125K per year
 - Objective: To improve NWS forecast and warning services by exploiting S&T improvements to the fullest
 - Applied research and education projects involving collaboration between NWS forecasters and university experts
 - Proposals must address national, regional or NCEP-related science needs/priorities
 - Priority given to proposals that have the potential to be expanded nationally through the Operational Proving Ground



COMET Outreach



✓ COMET Outreach Program

- Smaller-scale competitive grant program managed by UCAR/COMET via OST funding and oversight
- COMET Outreach RFP administered by COMET
- Cooperative Projects: 1-3 year studies of \$30-\$40K/year
- Partners Projects: smaller scale, one-year, up to \$15K/year
- Case-study oriented
- Workshop support
- No new or recently completed projects due to lack of funding



CSTAR Mechanics



- ✓ CSTAR FFO/RFP issued every summer (every 3rd year is an “off year”)
- ✓ RFP based on science priorities established by NWS with input of SSD Chiefs, NCEP, and others
- ✓ Proposals evaluated by team consisting largely of the above
- ✓ Announcement of awards around the New Year
- ✓ Funding normally obligated by May 1



CSTAR Benefits



- ✓ Forecast and Warning Improvement – high-impact events
 - Accelerated transition of research to operations through NWS WFO' s/ RFC' s...NCEP...NWS Testbeds and OPG

- ✓ Leveraging Resources
 - Value of engaging world-class researchers, professors, graduate students at academic institutions far exceeds cost
 - Excellent student recruiting tool for university recipients
 - Dozens of CSTAR “alumni” have been subsequently employed by NOAA



CSTAR

current status of projects



- ✓ 9 CSTAR Projects are currently underway
- ✓ 2 of these end April 30 2014: Texas Tech and Portland State
- ✓ SUNY Albany Project (CSTAR 4): No-Cost Extension to April 30 2015
- ✓ 6 projects were awarded during 2013 and will continue for 3 years.
- ✓ The FY14 RFP: 6 additional/new proposals recommended for funding; to begin around or after May 1 2014.
- ✓ Around May 2014: Expect to have 13 Active Projects



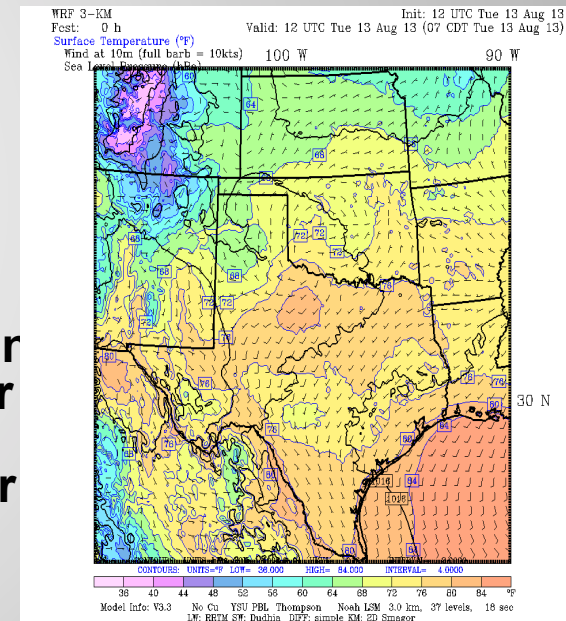
Texas Tech University

CSTAR Project



“Integration of Forecast Sensitivity into the NWS Forecasting Process to Improve Predictability of High-impact Weather ”

- **PI' s: Brian Ancell and Chris Weiss**
- **Term: 5/1/11 to 4/30/14**
- **NWS Collaborating Offices: WFOs ABQ, AMA, CRP, SAT, FWD, LBB and OUN; SR, SPC**
- **Tuning and testing of the WRF ensemble Kalman filter (EnKF) assimilation/forecasting, forecaster evaluation of ensemble products and the development of forecast sensitivity products for convection, winter storms, and flooding**



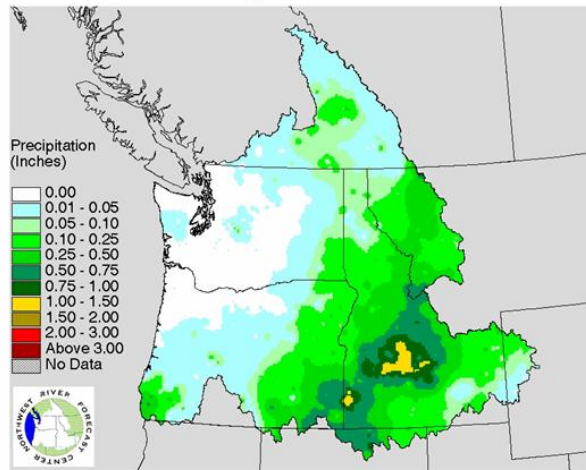


Portland State University

CSTAR Project



Yesterday's Observed Precipitation



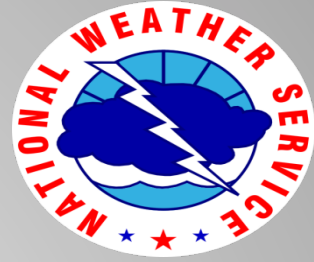
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“Towards Objective Multi-Modeling for Multi-Institutional Seasonal Water Supply Forecasting”

- **PI: Hamid Moradkhani**
- **Term: May 1 2011-April 30 2014**
- **NWS Collaborating Offices: NWRFC, CBRFC**
- **Optimally combine the multi-model ensemble hydrologic forecasts using the Community Hydrologic Prediction System (CHPS) as a framework to incorporate the suite of water supply forecasting models developed over the last three decades**

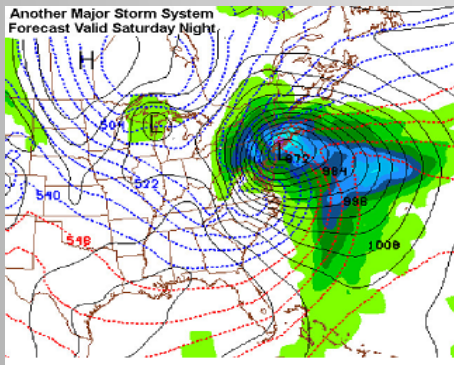


SUNY-Albany CSTAR-4 Project



“Collaborative Research with the National Weather Service on Cool-and Warm-Season Precipitation Forecasting over the Northeastern United States”

- **PI' s: Lance Bosart and Daniel Keyser**
- **Term: May 1 2010-April 30 2014* no-cost extension**
- **NWS Collaborating Offices: WFO' s ALB/BGM, NWS Eastern Region HQ, NCEP**
- **Transfer research into operations on:**
 1. **Mesoscale substructure of winter storms**
 2. **Thundersnow in heavy snow events**
 3. **Upper-level easterly wind anomalies in winter cyclones**



**SUNY-Albany CSTAR website: [http://
cstar.cestm.albany.edu/](http://cstar.cestm.albany.edu/)**



University of Oklahoma

CSTAR Project



“A Partnership to Develop, Conduct, and Evaluate Real-time Advanced Data Assimilation and High-Resolution Ensemble and Deterministic Forecasts for Convective-scale Hazardous Weather”

- **PI' s: Ming Xue, Fanyou Kong, Keith Brewster and Youngsun Jung**
- **Term: Jul 1 2013-June 30 2016**
- **NWS Collaborating Offices: NSSL, SPC, WPC, EMC, AWC, Developmental Testbed Center, WFO OUN**
- **Carry out real-time storm-scale ensemble forecast experiments**
- **Conduct advanced data assimilation experiments from radar network data over domains up to the full continental U.S.**
- **Findings will guide the design of NextGen operational systems**





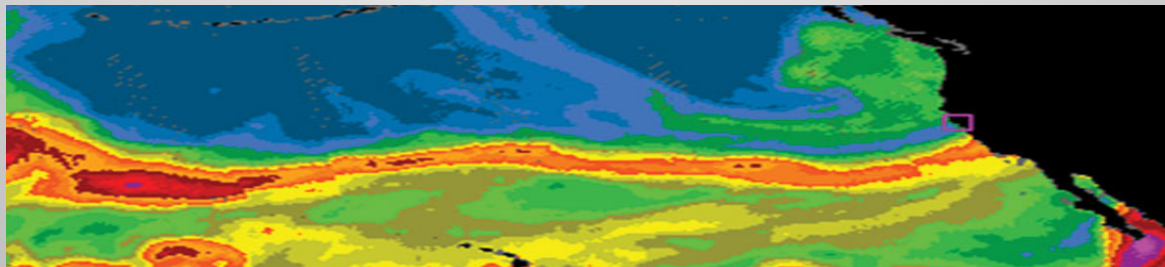
University of Utah

CSTAR Project



“Advancing Analysis, Forecast, and Warning Decision Support Capabilities for High-Impact Weather Events”

- **PI' s: W. James Steenburgh and John Horel**
- **Term: Sept 2013-2016**
- **NWS Collaborating Offices: NCEP-WPC, RTMA development team, and several WFO' s**
- **Advance precipitation forecasts over the western U.S. associated with inland atmospheric rivers**
- **Improve national observing & analysis systems through an evaluation of their boundary layer sensitivity during high-impact events**





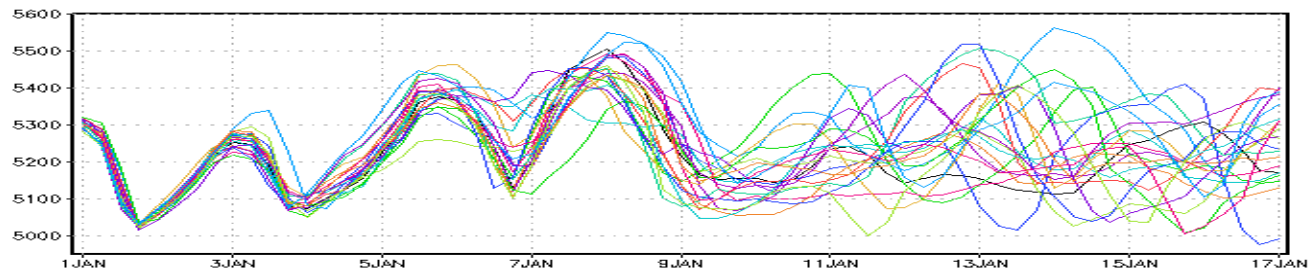
SUNY-Stony Brook

CSTAR Project



“An Evaluation and Application of Multi-Model Ensembles in Operations for High Impact Weather over the Eastern U.S.”

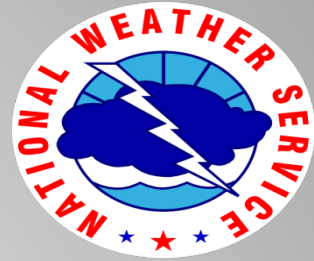
- **PI’ s: Brian Colle and Edmund Chang**
- **Term: Sept 2013-2016**
- **NWS Collaborating Offices: WPC, EMC, AWC, DTC, and multiple WFO’ s**
- **Demonstrate multi-model ensemble performance during high impact cool season events**
- **Expand ensemble sensitivity analyses**
- **Evaluate new ensemble software in the forecast offices**
- **Train forecasters on new ensemble display tools**





SUNY-Albany

CSTAR-V Project



“Collaborative Research with the National Weather Service on the Occurrence and Prediction of High-Impact Precipitation Events in the Northeastern U.S.”

- **PI's: Kristen Corbosiero and Ryan Torn**
- **Term: Sept 2013-2016**
- **NWS Collaborating Offices: WFO ALY/BGM/PIT, NWS Eastern Region HQ, NCEP**
- **Transfer research into operations on:**
 1. **Severe convection in low predictive events**
 2. **Predictability of heavy precipitation with tropical moisture**
 3. **East coast atmospheric rivers**

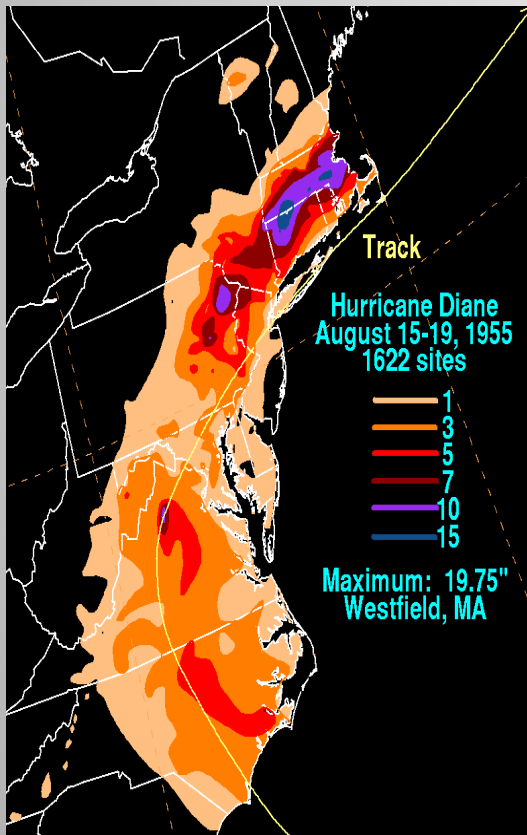
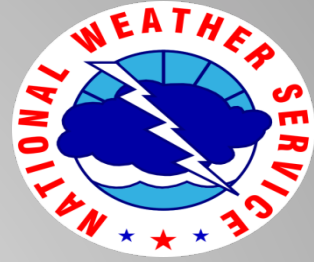
SUNY-Albany CSTAR website: <http://cstar.cesm.albany.edu/>





Florida State University

CSTAR Project



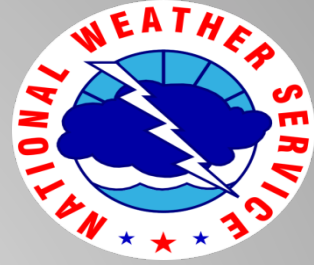
“Improved Forecasting of Extreme Rainfall Events Associated with Tropical Cyclones”

- **PI' s: Henry Fuelberg and Robert Hart**
- **Term: Sept 1 2013- Aug 31 2016**
- **NWS Collaborating Offices: NHC, WPC, WFO TLH**
- **Create bias-corrected model output by combining numerical model guidance with a storm analog climatology**
- **Enable forecasters to more easily determine rainfall distributions**
- **Improve accuracy of rainfall and flooding information to the public**



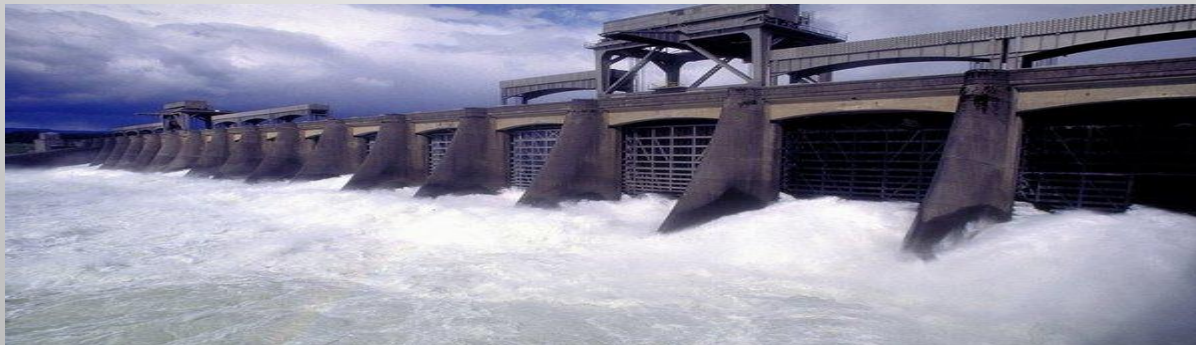
University of Washington

CSTAR Project



“Application of Dense Surface Observations for High-Resolution Ensemble-Based Analysis and Prediction”

- **PI’ s: Clifford Mass and Gregory Hakim**
- **Term: Sept 1 2013- Aug 31 2016**
- **NWS Collaborating Offices: EMC, various WFO’ s**
- **Develop and test innovations in ensemble-based mesoscale data assimilation and prediction**
- **Evaluate a variety of cases on a 4km testbed over the Northwest U.S.**





THANK YOU



Questions/Comments?

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